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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/806,619	03/28/2001	Thomas Dufner	870-003-133	3049

4955 7590 05/05/2006

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EXAMINER	
CHANG, JUNGWON	

ART UNIT	PAPER NUMBER
2154	

DATE MAILED: 05/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/806,619	DUFNER ET AL.	
	Examiner	Art Unit	
	Jungwon Chang	2154	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 December 2005*.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9 and 30-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 30-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Action is in response to RCE filed 12/05/05, which has been fully considered.

2. Amended claims 1-9 and 30-51 are presented for examination.

3. Claims 3, 4 and 7 are objected to because of the following informalities: The amended claim 1 includes the features of claim 3. Therefore, claim 3 has to be canceled. The dependency of claims 4 and 7 on claim 3 have to be corrected. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. **Claims 1-9, 30-38, and 43-51** are rejected under 35 U.S.C. 102(b) as being anticipated by Gee et al (US 4,743,815) (hereinafter Gee).

6. As for claim 1, Gee discloses an electronically commutated motor comprising a stator, a rotor and a program-controlled microprocessor, serving to control commutation of the motor (col. 2, lines 13-41, "In a first embodiment...a predetermined speed.");

an apparatus for ascertaining a time variable corresponding to a rotation-speed-

dependent time interval required by the rotor to rotate through a predefined angular distance, and being substantially inversely proportional to the rotation speed of the rotor (col. 2, lines 21-31, "The control system...to the stator.");

an apparatus which triggers a rotor position-dependent interrupt routine at predefined rotor positions (col. 2, lines 13-41, "In a first embodiment...a predetermined speed.");

an apparatus for calculating a first time interval dependent on that time variable (col. 2, lines 33-37, "And a microprocessor...the interrupt signal.");

an apparatus for triggering a motor control interrupt routine at an instant offset from a predefined rotor position, that offset corresponding to the first time interval dependent on the ascertained time variable (col. 2, lines 33-37, "And a microprocessor...the interrupt signal."; col. 7, lines 36-49, "Microprocessor 25 is...control logic 23.");

wherein the motor control interrupt routine contains program steps for effecting a commutation of the motor (col. 5, lines 9-19, "Although the system...other relevant parameters.").

7. As for claim 2, Gee discloses the motor according to claim 1, wherein

the motor control interrupt routine comprises program steps which prevent a commutation from being effected if the first time interval dependent on the sensed time variable is greater than a time span presently required by the rotor to travel through said predefined angular distance (col. 8, line 49 - col. 9, line 16, "If, on the other hand...from the subroutine.").

8. As for claim 3, Gee discloses the motor according to claim 2 further comprising an apparatus which triggers a rotor position-dependent interrupt routine at predefined rotor positions (col. 2, lines 13-41, "In a first embodiment...a predetermined speed.").

9. As for claim 4, Gee discloses the motor according to claim 3, wherein a timer, controllable by the rotor position-dependent interrupt routine, is provided, in order to sense the time variable that is substantially inversely proportional to the rotation speed of the rotor (col. 7, lines 36-49, "Microprocessor 25 is...control logic 23.").

10. As for claim 5, Gee discloses the motor according to claim 4, wherein the timer is also configured to trigger a motor control interrupt routine (col. 7, lines 36-49, "Microprocessor 25 is...control logic 23.").

11. As for claim 6, Gee discloses the motor according to claim 5, wherein the timer is loadable, during a rotor position-dependent interrupt, with a first predefined count value which corresponds to the time offset dependent on the ascertained time variable (col. 7, lines 36-49, "Microprocessor 25 is...control logic 23.");

and which brings about a motor control interrupt after counting that first predefined count value (col. 7, lines 36-49, "Microprocessor 25 is...control logic 23.").

12. As for claim 7, Gee discloses the motor according to claim 3 wherein a rotor-position-dependent interrupt has a higher priority than a motor control

interrupt (inherent).

13. As for claim 8, Gee discloses the motor according to claim 4, wherein

the timer, which in operation presents a timer value, is loadable, during a motor control interrupt, with a predefined count value (col. 7, lines 36-49, "Microprocessor 25 is...control logic 23.");

and subsequent to that loading operation a count is performed until the next rotor position-dependent interrupt, so as to ascertain, by taking the difference between the predefined count value and the timer value upon reaching the next rotor position-dependent interrupt, a time offset between these interrupt operations (col. 7, lines 57-63, "Next the microprocessor...near to commutation.").

14. As for claim 9, Gee discloses the motor according to claim 8, further comprising an autoreload register for loading the predefined count value which register stores the first predefined count value and feeds it to the timer during the motor control interrupt as the predefined count value (col. 7, lines 43-49, "Timer A controls...control logic 23.").

15. As for claims 30 and 38, Gee discloses a method of rotation-speed-dependent commutation of an electronically commutated motor comprising a stator, a rotor and a program-controlled microprocessor serving to control commutation of said motor, comprising the steps of:

a) ascertaining a rotation-speed-dependent time value for a time variable corresponding to a time interval required by the rotor to rotate through a predefined angular distance, and being substantially inversely proportional to the rotation speed

of the rotor (col. 2, lines 21-31, "The control system...to the stator."; col. 7, line 36 - col. 7, line 49, "Microprocessor 25 is...control logic 23.");

b) from that time variable, calculating, according to a predefined calculation rule, a numerical value (col. 7, line 36 - col. 7, line 63, "Microprocessor 25 is...near to commutation.");

c) measuring, beginning at a predefined first rotor position, a first time interval corresponding to that calculated numerical value (col. 7, lines 36-63, "Microprocessor 25 is...near to commutation."; col. 8, lines 49-61);

d) determining when said first time interval has elapsed, and thereafter triggering a commutation (col. 7, lines 36-63, "Microprocessor 25 is...near to commutation.");

e) subsequent to the end of said first time interval, measuring a second time interval until said rotor reaches a predefined second rotor position (col. 7, line 36 - col. 8, line 61, Microprocessor 25 is...from the subroutine."; col. 8, lines 49-61);

f) adding the first and second time intervals to obtain, from their sum, a new rotation-speed-dependent value for the time variable that is substantially inversely proportional to the rotation speed of the motor (col. 7, line 36 - col. 8, line 61, Microprocessor 25 is...from the subroutine."; Figs. 7A-7C; col. 8, lines 49-61).

16. As for claim 31, Gee discloses the method of claim 30, further comprising the step of correcting said sum by at least one correction factor (col. 7, line 36 - col. 9, line 16, Microprocessor 25 is...the subroutine."; Figs. 7A-7C).

17. As for claim 32, Gee discloses the method according to claim 30, wherein said predefined calculation rule comprises

subtracting a predefined time from said time variable that is substantially inversely proportional to the rotation speed of the rotor (col. 7, line 36 - col. 9, line 16, Microprocessor 25 is...the subroutine."; Figs. 7A-7C).

18. As for claim 33, Gee discloses the method according to claim 30, further comprising

determining whether the first time interval corresponding to the calculated numerical value is greater than a time offset between the predefined rotor position and the predefined second rotor position, and, if so, directly sensing the time offset between those two rotor positions and using the time offset as said time variable that is substantially inversely proportional to the rotation speed of the motor (col. 7, line 36 - col. 9, line 16, Microprocessor 25 is...the subroutine."; Figs. 7A-7C).

19. As for claim 34, Gee discloses the method according to claim 30, further comprising

comparing said time variable that is substantially inversely proportional to the rotation speed of the motor to a predefined value corresponding to a minimum rotation speed (col. 7, line 36 - col. 9, line 16, Microprocessor 25 is...the subroutine."; Figs. 7A-7C);

storing a logical value, corresponding to a result of said comparison result (inherent); and

if that logical value has a predefined value, suppressing the triggering of a commutation that would otherwise be accomplished after the first time has elapsed (col. 7, line 36 - col. 9, line 16, Microprocessor 25 is...the subroutine."; Figs. 7A-7C).

20. As for claim 35, Gee discloses the method according to claim 30, further comprising

detecting when a predefined rotor position is reached, and

executing a rotor-position-dependent interrupt with an interrupt routine at the beginning of which a timer, providing time measurement,

is stopped, and its instantaneous value is stored in a variable (col. 7, lines 36-63, "Microprocessor 25 is...near to commutation.").

21. As for claim 36, Gee discloses the method according to claim 35, further comprising

in the rotor-position-dependent interrupt routine, stopping the timer providing time measurement, then loading the timer with a numerical value previously calculated in accordance with the predefined calculation rule, and thereafter restarting the timer (col. 7, lines 36-63, "Microprocessor 25 is...near to commutation.").

22. As for claim 37, Gee discloses the method according to claim 36, further comprising

using the time span between the stopping of the timer providing time measurement and the restarting thereof, as a correction factor during said step of ascertaining the time variable that is substantially inversely proportional to the rotation speed of the motor (col. 7, line 36 - col. 9, line 16, Microprocessor 25 is...the subroutine."; Figs. 7A-7C).

23. As for claim 43, Gee discloses an electronically commutated motor comprising a stator (col. 2, lines 21-27),

a rotor (col. 2, lines 21-27),

a microprocessor which executes a program which controls commutation of the motor (col. 2, lines 13-41, "In a first embodiment...a predetermined speed."),

means for starting a timer with a predefined start value dependent on a time variable that is substantially inversely proportional to the rotation speed of the motor at least one predefined rotational position of said rotor (col. 2, lines 21-37, "The control system...the interrupt signal."; col. 7, lines 36-49, "Microprocessor 25 is...control logic 23.");

means, responsive to said timer, for triggering an interrupt in said program of said microprocessor after elapse of a time interval having a duration dependent on the start value (col. 2, lines 21-37, "The control system...the interrupt signal."; interrupt control logic 23, Fig. 3); and

means for commutating said motor during said interrupt (col. 2, lines 21-37, "The control system...the interrupt signal."; switch state control 25, Fig. 3).

24. As for claim 44, Gee discloses the motor according to claim 43, further comprising

means for deriving the start value of the timer as a function of the rotation-speed-dependent time interval which the rotor has required, in a time period preceding that commutation, to rotate through a predefined rotation angle (In order to determine motor speed, it is necessary to measure or calculate the time interval of an angular rotation of the motor, since angular velocity equals change in angular position divided by change in time.; col. 5, lines 15-19, "This particular system...other

relevant parameters.").

25. As for claim 45, Gee discloses the motor according to claim 44, wherein said means for deriving further comprises

means for subtracting a predefined time from the rotation speed-dependent time interval as part of a calculation of the start value (microprocessor 25, Fig. 3; col. 8, line 62 - col. 9, line 16, "When the interrupt signal...from the subroutine.").

26. As for claim 46, Gee discloses a method of determining a rotation speed-dependent variable in an electronically commutated motor which includes

a stator,

a permanent-magnet rotor,

a galvanomagnetic sensor controlled by that rotor, a microprocessor, a control program associated with that microprocessor, and a timer (col. 2, lines 13-41, "In a first embodiment...a predetermined speed."), comprising the steps of :

a) converting an output signal of the galvanomagnetic sensor into a substantially square-wave signal (Fig. 2; col. 5, lines 9-19, "Although the system...other relevant parameters.");

b) sensing, in the microprocessor, predefined signal changes of the square-wave signal and converting each signal change into a respective rotor-position-dependent interrupt (col. 4, lines 49-66, "The motor terminals...microprocessor 25.");

c) at a rotor-position-dependent interrupt, recording a first counter status of the timer (inherent for measuring time between commutation steps; col. 7, lines 43-63, "Timer A controls...near to commutation.");

d) at a rotor-position-dependent interrupt subsequent thereto, recording a second counter status of the timer (inherent for measuring time between commutation steps; col. 7, lines 43-63, "Timer A controls...near to commutation.");

e) calculating a difference between the two counter statuses and deriving from said difference, a value which corresponds to time required by the rotor to travel through a predefined rotation angle (inherent for measuring time between commutation steps; col. 7, lines 43-63, "Timer A controls...near to commutation."); and using said value as the rotation-speed-dependent variable (col. 7, lines 43-63, "Timer A controls...near to commutation.").

27. As for claim 47, Gee discloses an electronically commutated motor comprising

a stator and a rotor (col. 2, lines 13-41, "In a first embodiment...a predetermined speed."),

a program-controlled microprocessor, adapted for controlling the commutation of the motor (col. 2, lines 13-41, "In a first embodiment...a predetermined speed."); and

a rotor position sensor whose output signal is applied, for purposes of analysis by the microprocessor, to an interrupt-capable input of that microprocessor, for processing therein (zero crossings detector 21 and interrupt control logic 23, Fig. 3);

said microprocessor furnishing, at at least one output of the microprocessor, a control signal, for commutation of the motor, that is shifted, with respect to the signal of the rotor position sensor, by a shift time, the duration of the shift time begin a function of the rotation speed of said motor (switch state control 25, Fig. 3; col. 5, lines 15-19, "This particular system...other relevant parameters.").

28. As for claim 48, Gee discloses the electronically commutated motor according to claim 47, wherein the microcontroller comprises at least one interrupt-capable timer with which the at least one output of the microprocessor, serving to deliver the control signal, is influenced (col. 7, lines 36-49, "Microprocessor 25 is...control logic 23.").

29. As for claim 49, Gee discloses the electronically commutated motor according to claim 48, wherein the timer is, in a specific state, automatically reloaded with a value and restarted (col. 7, lines 36-49, "Microprocessor 25 is...control logic 23.").

30. As for claims 50 and 51, Gee discloses the electronically commutated motor according to claims 48 and 49, wherein the microprocessor triggers an interrupt at each change in the signal of the rotor position sensor; and wherein the timer and the interrupts are used to measure a value dependent on rotor speed (col. 2, lines 13-41, "In a first embodiment...a predetermined speed."; col. 7, lines 36-49, "Microprocessor 25 is...control logic 23.").

Claim Rejections - 35 USC § 103

31. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

32. **Claims 39-42** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gee et al (US 4,743,815) (hereinafter Gee).

33. As for claim 39, although arguably inherent to Gee, Gee does not specifically disclose determining whether sufficient process time is available for executing a non-time critical process step. "Official Notice" is given that it is both well-known and expected in the computer arts to determine whether sufficient process time is available for executing a non-time critical process step and to execute the steps when there is time. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Gee by determining whether sufficient process time is available for executing a non-time critical process step, because this would prevent system faults and delays resulting from insufficient processor resources.

34. As for claim 40, Gee discloses a method similar to claim 39, further comprising calculating said time variable that is substantially inversely proportional to the rotation speed of the motor, and calculating the numerical value on which measurement of the first time interval is based, as part of said subroutine executed when processor time is available (col. 7, lines 43-63, "Timer A controls...near to commutation.").

35. As for claims 41 and 42, although arguably inherent to Gee, Gee does not specifically disclose loading from a nonvolatile memory associated with the motor at least one parameter necessary for calculations into a random-access memory of the microprocessor via a bus connection. "Official Notice" is given that it is both well-known and expected in the computer arts to transfer values between a nonvolatile memory and random-access memory (RAM) via a bus connection, and further to modify the stored value(s) in the memories. It would have been obvious to one of

ordinary skill in the art at the time of the invention to modify Gee by loading from a nonvolatile memory associated with the motor at least one parameter necessary for calculations into a random-access memory of the microprocessor via a bus connection and to modify the stored value(s), because this would improve performance of the microprocessor.

Response to Arguments

102 Claim Rejections

36. Applicant's arguments filed on 12/5/05 have been fully considered but they are not persuasive.

(1) Applicant asserts on page 13 of the Remarks that Gee col. 2, lines 21-31, does not teach how to use a rotation-speed-dependent parameter as taught by applicants.

In reply to argument (1), the Examiner respectfully disagrees. Gee explicitly teaches using a rotation-speed-dependent parameter (col. 2, lines 13-41; col. 2, line 64 – col. 3, line 22).

(2) Applicant asserts on page 14 of the Remarks that Gee fails to teach or suggest rotation-speed-dependent variables which are inversely proportional to rotation speed.

In reply to argument (2), the Examiner respectfully disagrees, finding that this limitation is inherent to Gee. As noted by Applicant, frequency is directly proportional to the rotation speed. The frequency is the inverse of the period, which is therefore by definition inversely proportional to the rotation speed. That is, f=1/T,

where f is the frequency and T is the period. Thus, using either the frequency or the period of the motor are *directly equivalent* methods, since the variables may be substituted for one another at any point, as understood by one of ordinary skill in the art. Gee explicitly teaches calculating the frequency in col. 7, lines 57-59. As noted in this passage, the value stored in Timer B is the commutation period of the motor, which is inversely proportional to the speed. Therefore, Gee anticipates this limitation of the claims.

(3) Applicant asserts on page 18 of the Remarks that Gee motor belongs in the "late ignition" genre, not the "ignition advance" genre of the present invention.

In reply to argument (3), In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "ignition advance") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

For all of these reasons, claims 1-9, 30-38, and 43-51 are properly rejected under 35 USC 102.

103 Claim Rejections

37. Applicant's arguments filed on 12/5/05 have been fully considered but they are not persuasive.

Specifically, claims 39-42 were rejected under 35 USC 103(a) as being *obvious*

in view of Gee. Therefore, Gee is not required to teach each limitation of the claims. That is, the limitations are obvious for the reasons laid out in the rejection.

Therefore, claims 39-42 are properly rejected under 35 USC 103(a).

Conclusion

38. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Skinner et al, patent 6,768,279, Erdman et al, patent 6,414,408, Rossi, patent 6,107,763, Beifus, patent 6,104,113, Fukao et al, patent 5,936,370 disclose a method and system for a motor to provide a position signal representative of the position of the rotating assembly and a commutating circuit controls a power switching circuit to commutate the power switching circuit at a commutating angle to achieve a desired rotating speed of the rotating assembly.

39. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jungwon Chang whose telephone number is 571-272-3960. The examiner can normally be reached on 9:30-6:00 (Monday-Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John A Follansbee can be reached on 571-272-3964. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jungwon Chang
May 1, 2006